

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Mercuri et al.
Serial No: 09/871,887
Filed: June 1, 2001
For: Assembling Bipolar Plates
Group Art Unit: 1733
Examiner: Gladys Josefina Piazza Corcoran
Attorney's Docket No: P1047/N7343
Customer No: 23456

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DECLARATION OF ROBERT A. MERCURI

I, Robert A. Mercuri, declare and state as follows:

1. I am the named inventor on the above-captioned application.
2. I studied chemistry and physics at Western Reserve University and was awarded a B.S. degree from Cleveland State University. In 1954 he joined the Electrochemistry Group of Carbon Products Company (now GrafTech International Ltd., parent to Advanced Energy Technology Inc., formerly known as Graftech Inc.) and worked in the fields of molten salt electrochemistry, high temperature/high vacuum technology and CVD processes. I was co-inventor of a process produce silane for the manufacture of "doped" device grade silicon. Subsequent to this development work Union Carbide constructed a facility to manufacture silane in Washogal Washington. During this period, my research included boron nitride fiber development and early efforts on what is now known as mesophase pitch.

3. During the mid 1960's through the mid 1980's, I focused on Contract R&D for the Corporation: involvement included Pratt & Whitney Alkaline fuel cell electrodes, Department of Defense (DOD) coatings and insulators, Classified Atomic Energy Commission R&D and preproduction of fine grain high CTE isotropic graphite for gas cooled reactors. In addition, I performed R&D for the Naval Ordnance Lab, developing graphite for reentry bodies, This program resulted in the construction of a Controlled Line Facility in Parma, Ohio to manufacture the graphite and an addition at a facility in Lakewood, Ohio to process the material into the relevant hardware.

4. From the mid 1980's until my retirement in 2003, my focus was natural graphite products. Indeed, during the 1960's, I worked with James Shane, the inventor of flexible graphite (see, U.S. Patent No. 3,404,061). I am recognized as an expert worldwide in the industrial and automotive uses of flexible graphite products, including for fuel cell applications. In 1990, I received a Union Carbide Corporation Chairman's Award for my contributions to the corporation.

5. Since 1992, I have concentrated my efforts in the development of flexible graphite materials and components for proton exchange membrane fuel cells. My contributions to fuel cell material development resulted in my having received the GrafTech Chairman's Award in 2000.

6. I am a named inventor on over 50 issued U.S. patents and an author of many publications.

7. I retired from GrafTech International in 2003, after 49 years in the carbon and graphite industry.

8. Under my supervision, a bipolar fuel cell flow field plate formed of compressed particles of exfoliated graphite was prepared by forming a first component having an operative side and a back side, and having a protrusion formed on its back side; forming a second component having an operative side and a back side, and having a recess formed in its back side, the recess being complementary to the protrusion of the first component; and assembling the first and second components so that the protrusion of the first component is received in the recess of the second component to form a bipolar graphite article.

9. Also under my supervision, a bipolar fuel cell flow field plate formed of compressed particles of exfoliated graphite was prepared by forming a first component having an operative side and a back side, with its back side being flat; forming a second component having an operative side and a back side, with its back side being flat; and assembling the first and second components by providing adhesive about the perimeter of the plates to join them together to form a bipolar graphite article.

10. Each of the bipolar plates formed by the methods of paragraphs 8 and 9 herein were then separated by hand, using sufficient force to break the plates apart from each other.

11. In the case of the bipolar plate formed in accordance with the above-captioned application, as described at paragraph 8 herein, the plates themselves broke, demonstrating that the bond formed between the two plates was stronger than the plate material itself. In the case of the bipolar plate formed in accordance with paragraph 9 herein, the bond between the plates separated, leaving two intact plates.

12. This demonstrated to me that the method of the present invention provides a stronger bond between flow field plates formed of sheets of compressed particles of exfoliated graphite than prior art methods of bonding two graphite sheets together, and forms a stronger bipolar plate for an electrochemical fuel cell.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code

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and that such willful false statements may jeopardize the validity of the
application or any patent issued thereon.

Robert A. Mercuri
Robert A. Mercuri

12-30-05
Date